

**STATE OF UTAH**  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL, GAS AND MINING

FORM 3

AMENDED REPORT ☐

<b>APPLICATION FOR PERMIT TO DRILL</b>						<b>1. WELL NAME and NUMBER</b> GORDON CREEK STATE NW 32-14-8					
<b>2. TYPE OF WORK</b> DRILL NEW WELL <input checked="" type="checkbox"/> REENTER P&A WELL <input type="checkbox"/> DEEPEN WELL <input type="checkbox"/>						<b>3. FIELD OR WILDCAT</b> UNDESIGNATED					
<b>4. TYPE OF WELL</b> Gas Well <input type="checkbox"/> Coalbed Methane Well: YES <input type="checkbox"/>						<b>5. UNIT or COMMUNITIZATION AGREEMENT NAME</b>					
<b>6. NAME OF OPERATOR</b> GORDON CREEK, LLC						<b>7. OPERATOR PHONE</b> 403 453-1608					
<b>8. ADDRESS OF OPERATOR</b> 1179 E Main #345, Price, UT, 84501						<b>9. OPERATOR E-MAIL</b> rironside@thunderbirdenergy.com					
<b>10. MINERAL LEASE NUMBER (FEDERAL, INDIAN, OR STATE)</b> ML-46539			<b>11. MINERAL OWNERSHIP</b> FEDERAL <input type="checkbox"/> INDIAN <input type="checkbox"/> STATE <input checked="" type="checkbox"/> FEE <input type="checkbox"/>			<b>12. SURFACE OWNERSHIP</b> FEDERAL <input type="checkbox"/> INDIAN <input type="checkbox"/> STATE <input checked="" type="checkbox"/> FEE <input type="checkbox"/>					
<b>13. NAME OF SURFACE OWNER (if box 12 = 'fee')</b>						<b>14. SURFACE OWNER PHONE (if box 12 = 'fee')</b>					
<b>15. ADDRESS OF SURFACE OWNER (if box 12 = 'fee')</b>						<b>16. SURFACE OWNER E-MAIL (if box 12 = 'fee')</b>					
<b>17. INDIAN ALLOTTEE OR TRIBE NAME (if box 12 = 'INDIAN')</b>			<b>18. INTEND TO COMMINGLE PRODUCTION FROM MULTIPLE FORMATIONS</b> YES <input type="checkbox"/> (Submit Commingling Application) NO <input checked="" type="checkbox"/>			<b>19. SLANT</b> VERTICAL <input checked="" type="checkbox"/> DIRECTIONAL <input type="checkbox"/> HORIZONTAL <input type="checkbox"/>					
<b>20. LOCATION OF WELL</b>		<b>FOOTAGES</b>		<b>QTR-QTR</b>	<b>SECTION</b>	<b>TOWNSHIP</b>		<b>RANGE</b>		<b>MERIDIAN</b>	
LOCATION AT SURFACE		269 FNL 767 FWL		NWNW	32	14.0 S		8.0 E		S	
Top of Uppermost Producing Zone		269 FNL 767 FWL		NWNW	32	14.0 S		8.0 E		S	
At Total Depth		269 FNL 767 FWL		NWNW	32	14.0 S		8.0 E		S	
<b>21. COUNTY</b> CARBON			<b>22. DISTANCE TO NEAREST LEASE LINE (Feet)</b> 269			<b>23. NUMBER OF ACRES IN DRILLING UNIT</b> 160					
			<b>25. DISTANCE TO NEAREST WELL IN SAME POOL (Applied For Drilling or Completion)</b> 57.0			<b>26. PROPOSED DEPTH</b> MD: 4437 TVD: 4437					
<b>27. ELEVATION - GROUND LEVEL</b> 7670			<b>28. BOND NUMBER</b> RLB0010790			<b>29. SOURCE OF DRILLING WATER / WATER RIGHTS APPROVAL NUMBER IF APPLICABLE</b> 91-5205					
<b>Hole, Casing, and Cement Information</b>											
<b>String</b>	<b>Hole Size</b>	<b>Casing Size</b>	<b>Length</b>	<b>Weight</b>	<b>Grade &amp; Thread</b>	<b>Max Mud Wt.</b>	<b>Cement</b>	<b>Sacks</b>	<b>Yield</b>	<b>Weight</b>	
Surf	11	8.625	14 - 206	24.0	J-55 Casing/Tubing	8.7	Class G	975	1.142	15.84	
Prod	7.875	5.0	0 - 4437	17.0	N-80 LT&C	8.7	Class C	212	4.12	10.5	
							Class C	109	2.39	11.5	
<b>ATTACHMENTS</b>											
<b>VERIFY THE FOLLOWING ARE ATTACHED IN ACCORDANCE WITH THE UTAH OIL AND GAS CONSERVATION GENERAL RULES</b>											
<input checked="" type="checkbox"/> WELL PLAT OR MAP PREPARED BY LICENSED SURVEYOR OR ENGINEER						<input checked="" type="checkbox"/> COMPLETE DRILLING PLAN					
<input type="checkbox"/> AFFIDAVIT OF STATUS OF SURFACE OWNER AGREEMENT (IF FEE SURFACE)						<input type="checkbox"/> FORM 5. IF OPERATOR IS OTHER THAN THE LEASE OWNER					
<input type="checkbox"/> DIRECTIONAL SURVEY PLAN (IF DIRECTIONALLY OR HORIZONTALLY DRILLED)						<input checked="" type="checkbox"/> TOPOGRAPHICAL MAP					
<b>NAME</b> Barry Brumwell			<b>TITLE</b> Vice President-Operations			<b>PHONE</b> 403 453-1608					
<b>SIGNATURE</b>			<b>DATE</b> 12/04/2012			<b>EMAIL</b> bbrumwell@thunderbirdenergy.com					
<b>API NUMBER ASSIGNED</b> 43007503530000						<b>APPROVAL</b>					

**Received: June 05, 2013**

**DRILLING PLAN and PROGRAM**

Attached to UDOGM Form 3

**GORDON CREEK, LLC.**

**GORDON CREEK ST NW-32-14-8**

SURFACE LOCATION: 269' FNL & 767' FWL

NW/4 of NW/4 of Section 32-14S-8E

Carbon County, Utah

**1. SURFACE GEOLOGIC FORMATION**

Emery Sandstone Member of the Mancos Shale

**2. ESTIMATED TOPS OF IMPORTANT GEOLOGIC MARKERS**

Blue Gate Shale Member top: 2,063' KB

Lower Blue Gate Bentonite Marker: 3,832' KB

Ferron SS: 3,967' KB

Tununk Shale: 4,379' KB

**3. PROJECTED GAS & H<sub>2</sub>O ZONES**

It is anticipated that groundwater may be encountered within the Emery Sandstone Member of the Mancos Shale. Any water encountered will be reported on a Form 7 "Report of Water Encountered During Drilling". All indications of usable water will be reported.

Casing & cementing will be done to protect potentially productive hydrocarbons, lost circulation zones, abnormal pressure zones and prospectively valuable mineral deposits.

Surface casing will be tested to 500 psi and the Production casing will be tested to 1,500 psi, with a minimum of 1 psi/ft of the last casing string setting depth.

**4. PROPOSED CASING AND CEMENTING PROGRAMS**

Refer to EXHIBIT "A" for casing design information

**A. CASING PROGRAM**

HOLE SIZE (in)	CASING SIZE (in)	WEIGHT (#/ft)	GRADE	JOINT	DEPTH SET (ft)
14 <sup>3</sup> / <sub>4</sub>	12 <sup>3</sup> / <sub>4</sub>	40.5	H-40	ST&C	0 – 40
11	8 <sup>5</sup> / <sub>8</sub>	24.00	J-55	ST&C	0 – 2,065
7 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	17.00	N-80	LT&C	0 – 4,437

## **B. CEMENTING PROGRAM**

The 8 <sup>5</sup>/<sub>8</sub>" surface casing will be set and cemented full length with approximately 975 sacks of 0-1-0 Class "G" cement + 2% CaCl<sub>2</sub> + 0.25 #/sk of cellophane flakes mixed at 15.84 ppg (yield = 1.142 ft<sup>3</sup>/sk); volume based on nominal hole size + 100% excess. The cement will be circulated back to surface. In the event that the cement is not circulated back to surface, a 1" top out job will be performed with 0-1-0 Class "G" cement + 2% CaCl<sub>2</sub> + 0.25 #/sk of cellophane flakes mixed at 15.84 ppg (yield = 1.142 ft<sup>3</sup>/sk).

The 5 <sup>1</sup>/<sub>2</sub>" production casing will be set and cemented full length using a MINIMUM of 212 sx of LEAD CEMENT incorporating 2% Gypsum-60 + 0.25 #/sk of Superflake + 2% Super Sil SP mixed at 10.5 ppg (yield = 4.12 ft<sup>3</sup>/sk); cement volume based on nominal hole size + 100% excess, followed by a MINIMUM of 109 sx of HIGH EARLY COMPRESSIVE STRENGTH TAIL CEMENT incorporating 2% Gypsum-60 + 0.25 #/sk of Superflake + 2% Super Sil SP mixed at 11.5 ppg (yield = 2.39 ft<sup>3</sup>/sk); cement volume based on nominal hole size + 50% excess over the bottom 1000' of hole.

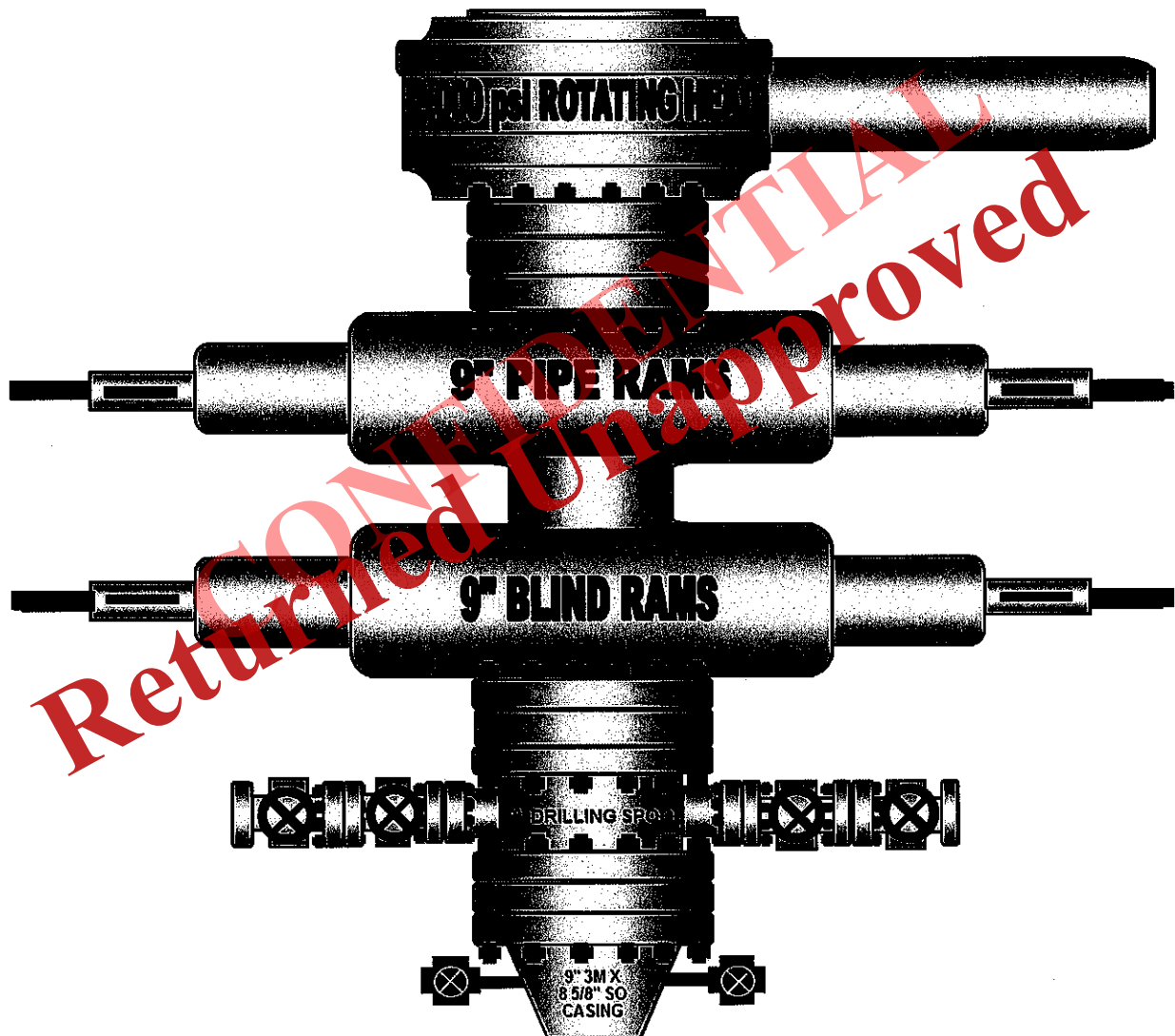
It is our intention for the cement mixture to be circulated back to surface, IF POSSIBLE.

### **THE FOLLOWING SHALL BE ENTERED INTO THE DRILLER'S LOG:**

- I. Blowout preventer pressure tests, including test pressures and results;
- II. Blowout preventer tests for proper functioning;
- III. Blowout prevention drills conducted;
- IV. Casing run, including size, grade, weight, and depth set;
- V. How the pipe was cemented, including amount of cement, type, whether cement was circulated back to surface, location of the cementing tools, etc.;
- VI. Waiting on cement time for each casing string;
- VII. Casing pressure tests after cementing, including test pressures and results.

5. THE OPERATOR'S MINIMUM SPECIFICATIONS FOR PRESSURE CONTROL

Below is a schematic diagram of the blowout preventer equipment requirements for this drilling operation. A 9' X 3,000 psi double gate BOP will be used with a 2,000 psi Rotating Head utilized for air drilling operations. ALL BOPE will be pressure tested to the required operating pressures of each component. All tests will be recorded in the Driller's Report Book. The physical operation of each component of the BOP's will be checked on each trip.



**6. THE TYPE AND CHARACTERISTICS OF THE PROPOSED CIRCULATING FLUIDS / MUDS**

0' – 2,065'	11" Surface Hole	Drill with air, will mud-up if necessary.
2'065' – TMD	7 7/8" Main Hole	Drill with air, 500 psi @ 1500-2300 ft <sup>3</sup> /min

Will "mud up" at Total Depth to run logs and casing. Will mud up sooner if hole conditions dictate. It is anticipated that drilling fluid densities of 8.3 – 8.7 #/gal will be utilized when "mudded up".

**7. THE TESTING, LOGGING AND CORING PROGRAMS**

Open hole logs consisting of a CNL-LDT-GR-CAL will be run from above the Blue Gate Shale to TMD. A DIL-GR-SP log will be run from TMD to surface casing.

**8. ANY ANTICIPATED ABNORMAL PRESSURES or TEMPURATURES**

No abnormal pressures or temperatures have been noted or reported in wells drilled in the area nor at the depths anticipated in this well. Bottom hole pressure expected is approximately 900 psi maximum. No hydrogen sulfide or other hazardous gases or fluids have been found, reported or are known to exist at these depths in the area.

**9. ANTICIPATED STARTING DATE AND DURATION OF THE OPERATIONS**

The well will be drilled as soon as logistically possible after the APD Approval has been issued. Verbal and/or written notifications listed below shall be submitted in accordance with instructions from the Division of Oil, Gas & Mining:

- a) prior to beginning construction;
- b) prior to spudding;
- c) prior to running any casing or BOP tests;
- d) prior to plugging the well, for verbal plugging instructions.

Spills, blowouts, fires, leaks, accidents or other unusual occurrences shall IMMEDIATELY be reported to the Division of Oil, Gas & Mining.

## EXHIBIT "A"

### CASING DESIGN GORDON CREEK ST NW-32-14-8 PROJECTED TD: 4,437' KB

#### SURFACE CASING (0' – 2,065')

Diameter	8 <sup>5</sup> / <sub>8</sub> "
Interval	2,065' to Surface
Weight	24 #/ft
Grade	J-55
Coupling	ST&C

#### Burst Design

The recommended practice is to base the burst rating of the casing string in psi to be at least numerically equal to 0.225 psi/ft times the setting depth in feet of the next casing string. The rating chosen was also intended to match the BOPE pressure rating and exceed the highest possible surface pressure of approximately 936 psig.

Burst required =	$0.225 \times 4,437$	998 psig
Burst rating of casing string:	2,950 psi	
<b>Safety factor =</b>	<b><math>2,950 \text{ psi} / 998 \text{ psi} =</math></b>	<b>2.96</b>

#### Collapse Design

Collapse pressure is negligible on this surface string.

#### Tension Design

String weight in air = 24 #/ft X 2,065' =	49,560 #
Tensile strength of joint	244,000 lbf
Safety factor of joint	4.9

## PRODUCTION CASING (0' – 4,437')

Diameter	5 ½"
Interval	4,437' to surface
Weight	17 #/ft
Grade	N-80
Coupling	LT&C

### Burst Design

An internal pressure gradient of 0.4863 psi/ft has been used as a basis for these calculations. This gradient is equivalent to the force exerted by 10 ppg drilling fluid, which is a much higher density of fluid than we anticipate being required to drill this well.

Burst rating of casing string:	7,740 psi	
Burst rating required:	$4,437' \times 0.4863 =$	2,158 psig
<b>Safety factor =</b>	<b><math>7,740 \text{ psi} / 2,158 \text{ psi} =</math></b>	<b><u>3.59</u></b>

### Tension Design

1.6 Safety factor of top joint, neglecting buoyancy and without over pull.

Tensile rating of casing joint:	348,000 lbf	
String Weight:	$4,437' \times 17 \text{ #/ft} =$	75,429 lbf
<b>Safety factor =</b>	<b><math>348,000 \text{ lbf} / 75,429 \text{ lbf} =</math></b>	<b><u>4.61</u></b>

### Collapse Design

Maximum anticipated mud weight is 10.0 ppg based on a mud gradient of 0.53 psi/ft.

Collapse rating of csg string:	6,280 psi	
Collapse rating required:	$4,437' \times 0.53 \text{ psi/ft} =$	2,352 psi
<b>Safety factor =</b>	<b><math>6,280 \text{ psi} / 2,352 \text{ psi} =</math></b>	<b><u>2.67</u></b>

### Production Casing Design

Interval (ft)	Weight (#/ft)	Grade	S.F. Burst	S.F. Collapse	S.F. Tension
4,437' – 0'	17	N-80	3.59	4.61	2.67

## **MULTI-POINT SURFACE USE PLAN**

Attached to UDOGM Form 3

**GORDON CREEK, LLC.**

**GORDON CREEK ST NW-32-14-8**

**SURFACE LOCATION:** 269' FNL & 767' FWL

**NW/4 of NW/4 of Section 32-14S-8E**

**Carbon County, Utah**

### **1. EXISTING ROADS**

- a. We do not plan to change, alter or improve upon ANY existing State or County roads.
- b. Existing roads will be maintained in the same or better condition.

### **2. PLANNED ACCESS**

- a. Access will be off of Benches Road in Section 28-14S-8E and travel SW through Sections 28, 29, 30 & 32 (SITLA SURFACE) and Section 30 (PRIVATE SURFACE - BURNSIDE) on a newly constructed roadway. ALL Surface Use Agreements in each Section as denoted above are in place and paid up for the planned roadway. The roadway will follow existing 2-track trails wherever possible, and is planned with minimal impact to the terrain.
- b. If the well is productive, the road will be maintained as necessary to prevent soil erosion and maintain year-round traffic. However, we may allow the access road to be gated and closed off during winter production operations and access the site with a snowmobile or other winter ATV.
- c. Maximum Width: 20' travel surface with 27' base.
- d. Maximum grade: 25%
- e. Road culverts may be required. Surface water will be diverted around the well pad as necessary.
- f. Any power lines and / or pipelines to/from the well will follow the proposed access route.

### **3. LOCATION OF EXISTING WELLS**

- a. As shown on the Civil Location Survey Plat for the well.

### **4. LOCATION OF EXISTING and/or PROPOSED FACILITIES**

- a. If the well is a producer, installation of required production facilities will follow the drilling and completion phase of well operations. Buried flow lines, water lines and electrical cable will follow the proposed access road and other existing access ROWs to the intersection with Thunderbird's main 12' pipeline corridor.
- b. Rehabilitation of all pad areas not used for production facilities will be made in accordance with landowner stipulations.



**5. LOCATION AND TYPE OF WATER SUPPLY**

- a. All water to be used for drilling operations will be obtained from area water wells drilled and owned by Gordon Creek, LLC.
- b. Water will be transported to location by truck over approved access roads.

**6. SOURCE OF CONSTRUCTION MATERIALS**

- a. Any necessary construction materials needed will be obtained locally from a private source and hauled to the location on existing roads.
- b. No construction or surfacing materials will be taken from Federal / Indian lands.

**7. METHODS FOR HANDLING WASTE DISPOSAL**

- a. As shown on the Survey Plat, a 100' X 60' X 8' deep "mud pit" with liner will be constructed on the well pad to hold the drilled solids and drilling fluids required during the drilling operations phase of the well. Three sides of the reserve pit will be fenced within 24 hours after completion of construction and the fourth side within 24 hours after drilling operations cease with four strands of barbed wire, or woven wire topped with barbed wire to a height of not less than four feet. The fence will be kept in good repair while the pit is drying.
- b. As the majority of this well is expected to be air drilled, a small reserve "bloomie" pit that drains into the main mud pit will be constructed with a minimum of one-half the total depth below the original ground surface on the lowest point within the pit. The pit will not be lined unless conditions encountered during construction warrant it or if deemed necessary by the DOGM Representative during pre-site inspection. Three sides of the reserve pit will be fenced within 24 hours after completion of construction and the fourth side within 24 hours after drilling operations cease with four strands of barbed wire, or woven wire topped with barbed wire to a height of not less than four feet. The fence will be kept in good repair while the pit is drying.
- b. Following drilling, the liquid waste will be evaporated from any pit and the pit backfilled and returned to natural grade. No liquid hydrocarbons will be discharged to the reserve pit or onto or off of the well pad.
- c. In the event that wellbore fluids are produced, any oil will be retained in tanks until sold and any water produced will be retained in the mud pit until its quality can be determined. The quality and quantity of the water will determine the method of disposal.
- d. Trash will be contained in a portable metal container and will be hauled from location periodically and disposed of at an approved disposal site. Chemical toilets will be placed on location and sewage will be disposed of at an appropriate disposal site.

**8. ANCILLARY FACILITIES**

- a. We anticipate no need for ancillary facilities with the exception of a personnel accommodation trailers with closed loop septic systems to be located on the drill site.

## **9. WELLSITE LAYOUT**

- a. Gordon Creek, LLC. has reduced to surface lease size (area stripped and levelled) for this location to the smallest lease size possible to accommodate the required drilling rig and support equipment.
- b. Any available topsoil will be removed from the location and stockpiled. The location of the rig, mud tanks, reserve and berm pits and all other drilling support equipment will be located as per common oilfield rig layouts.
- b. A blooie pit will be located 100' from the drill hole. A line will be placed on the surface from the center hole to the blooie pit. The blooie pit will not be lined, but will be fenced on four sides to protect livestock/wildlife.
- c. Access to the well pad will be as shown on the Civil Location Survey Plat for the well.
- d. Natural runoff will be diverted around the well pad.

## **10. PLANS FOR RESTORATION OF SURFACE**

- a. All surface areas not required for producing operations will be graded to as near original condition as possible and contoured to minimize possible erosion.
- b. Available topsoil will be stockpiled and will be evenly distributed over the disturbed areas and the area will be reseeded as prescribed by the landowner.
- c. Pits and any other area that would present a hazard to wildlife or livestock will be fenced off when the rig is released and removed.
- d. Rehabilitation will commence following completion of the well. Rat and mouse holes will be filled in immediately upon release of the drilling rig from the location. If the well site is to be abandoned, all disturbed areas will be re-contoured to the natural terrain found prior to location construction.

## **11. SURFACE OWNERSHIP**

- a. The well site and access road are on and across lands owned through the State of Utah School and Institutional Trust Lands Administration and covered by Surface Use Agreement # ML-46539. The operator shall contact the landowner and the Division of Oil, Gas and Mining 48 hours prior to beginning construction activities.

## **12. OTHER INFORMATION**

- a. The primary surface use is wildlife habitat and/or cattle grazing. The nearest dwelling is approximately 17.4 miles east (Price, Utah).
- b. If there is snow on the ground when construction begins, it will be removed before the soil is disturbed and piled downhill from the topsoil stockpile location.
- c. The back-slope and fore-slope will be constructed no steeper than 4:1.
- d. All equipment and vehicles will be confined to the access road and well pad.

- e. A complete copy of the approved Application for Permit to Drill (APD,) including all conditions and stipulations shall be on the well-site during construction and drilling operations.

There will be no deviation from the proposed drilling and/or workover program without prior approval from the Division of Oil, Gas & Mining.


**13. COMPANY REPRESENTATIVE**

Barry Brumwell, C.E.T.  
Vice President, Operations  
Gordon Creek LLC., a wholly owned subsidiary of  
Thunderbird Energy Corp.  
#800, 555 – 4<sup>th</sup> Avenue S.W.  
Calgary, Alberta, Canada T2P-3E7  
(403) 453-1608 (office)  
(403) 818-0696 (mobile)  
[bbrumwell@thunderbirdenergy.com](mailto:bbrumwell@thunderbirdenergy.com)

**14. CERTIFICATION**

I hereby certify that I, or persons under my direct supervision have inspected the proposed drill site and access route; that I am familiar with the conditions which presently exist; that the statements made in this plan are, to the best of my knowledge, true and correct, and that the work associated with the operations proposed herein will be performed by Gordon Creek, LLC. and its subcontractors in conformity with this plan and the terms and conditions under which it is approved.

11/30/2012  
DATE

  
Barry Brumwell, C.E.T.  
Vice President, Operations  
Gordon Creek LLC. / Thunderbird Energy Inc.



GORDON CREEK STATE NW-32-14S-8E

NW/4 OF NW/4, 269' FNL + 767' FWL

SURFACE LEASE #: ML-46539

MINERAL LEASE #: ML-46539

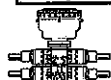
AFE: 11DRL022

WORKING INTEREST: 100%

RIG:

DRILL DAYS BELOW SURFACE CASING SHOE: 6

7 7/8" MAIN HOLE TO BE DRILLED WITH AIR



Survey Grd. Ele: 7670.3'  
Est. KB Elev: 7,682.3'  
KB - GRD used: 12.0' KB

8.625"  
Casing  
Set @ 2,065'

TOPS ft TVD

Emery Fm. @ SFC.

BASE OF GROUNDWATER TBD

Blue Gate Shale Mbr \*\* 2,063'

SURFACE CASING 2,065'

MUD UP WITH 3% KCl POLYMER  
DRILLING FLUID ONLY IF WATER INFLUX  
OCCURS OR TIGHT HOLE CONDITIONS  
OCCUR

Begin taking samples on  
Geologists orders

\* PRIMARY ZONE OF INT.  
\*\* SECONDARY ZONE

Lower Bluegate  
Bentonite Marker 3,832'

FERRON SS \* 3,967'  
(800 psi bhp)

Ferron Basal Marine SS 4,237'

Tununk Shale 4,379'

TD 4,437'

BOP'S  
9", 3000 #  
CASING  
BOWL

11"  
Surface  
Hole

7.875"  
Main  
Hole

5.500"  
CASING  
SET AT  
4,437'

SWEET WELL (NO H<sub>2</sub>S)

## CASING DESIGN

	Interval (ft)	O.D. (inches)	#/ft	Grade	Thread	Burst/Collapse (psi)	Joint Yield (lb)	Opt.Torque (ft.lbs)
Surface:	0 - 2,065	8 5/8	24	J-55	ST&C	2,950 / 1,370	244,000	2,440
Main:	0 - 4,437	5 1/2	17	N-80	LT&C	7,740 / 6,280	348,000	3,480

\*ENSURE THAT MARKER JOINTS ARE PLACED IN THE CASING STRING OPPOSITE ANY PAY ZONE

TARGET: FERRON SANDSTONE/COAL; CASING TO BE CUT 16" ABOVE CASING BOWL

## CEMENTING PROGRAM - Primary - Single Stage

	Bit Size (inches)	Cement	Additives	Yield (ft <sup>3</sup> /sk)	Volume (ax)	% Excess	Cmt Top (ft)	Density (#/gal)
Surface:	11	0-1-0 "G"	2% CaCl <sub>2</sub> + Cellophane flakes	1.142	975.0	100	SFC	15.84
Main:	7 7/8	LEAD	2% Gypsum-40 + 0.25 #/sk SuperFlake + 2% Super SS-SP	4.12	212.0	100	SFC	10.50
		TAIL	High Early Compressive + 2% Gypsum-40 + 0.25 Black SuperFlake + 2% Super SS-SP	2.39	109.0	50	3,437	11.50

## DRILLING FLUIDS

Interval	Type	NOTES
Surface: 0 - 2,065'	AIR	Drill with air, switch over to 3% KCl Polymer water if water influx overcomes air hammer.
	3% KCl Polymer	Run gel sweeps if sloughing occurs; run Cedar Fibre LCM if losses occur. Condition mud thoroughly prior to POOH to run/cement casing
Main: 2,065' - 4,437'	AIR	Drill with air, switch over to 3% KCl Polymer water if water influx overcomes air hammer. Attempt to drill to TD with Air, unless ROP in the Ferron is poor - then POOH and switch to PDC and 3% KCl drilling fluid.
	3% KCl Polymer	MUD UP with 3% KCl polymer drilling fluid ONLY if water Influx overcomes air hammer OR if TIGHT HOLE conditions become prevalent.

## 11" SURFACE HOLE:

- Spud with an approved water well/surface casing rig and air drill to surface TD of +/- 2,065'. Set surface casing at least 50' below any water influx zone. Survey every 100'. **Ensure that the surface hole deviation does not exceed 3°.**
- NOTE: If water influx overcomes air hammer or becomes problematic, MUD UP with a 3% KCl Polymer drilling fluid. Refer to the Mud Program and the Cementing Program for further information.
- NOTE: Ensure the well is cemented to surface on both casing strings. Contact the Operations Supervisor if any casing string cement job does not obtain returns to surface.
- Move the Surface Hole drilling rig off of location once surface casing is set and cemented.

## 7 7/8" MAIN HOLE:

- Move on conventional drilling rig and drill out with air hammer assembly and AIR DRILL as far as possible with air. Survey every 300'. Ensure that deviation does not exceed 3°. Notify Calgary operations immediately if a 3° deviation is exceeded.
- TIGHT HOLE is possible on connections. REAM HOLE at first indication of tight hole and attempt to continue to air drill.
- COAL/SHALE SEAMS can occur in the wellbore which may be faulted and unconsolidated resulting in sloughing hole conditions.
- H<sub>2</sub>S WILL NOT be encountered.
- MUD UP with a 3% KCl Polymer drilling fluid ONLY if water influx overrides the air hammer OR if tight hole conditions become prevalent.
- OVER PRESSURE: Generally, all zones in the wellbore should be underpressured (below normal water gradient) or have normal pressure gradients.
- LOST CIRCULATION should only have the potential to occur when drilling with fluids. ENSURE AND ADEQUATE AMOUNT OF LCM IS ON LOCATION AT ALL TIMES.
- FERRON SS/COAL PENETRATION - ATTEMPT TO AIR DRILL THROUGH THE FERRON ZONE. WATER may be encountered upon penetration. Ensure good hole conditions are prevalent to penetrating the FERRON.
- MUD UP - switch to a 3% Polymer drilling fluid system at Total Depth OR if water/tight hole problems occur.
- Mud Check - prior to POOH for logging, condition the mud and check mud properties with mudman. DO NOT POOH until the wellbore is circulating free of cuttings and the mud properties are optimal for logging.

## SAMPLE REQUIREMENTS/ EVALUATION

T-BIRD	Begin taking 2 sets of samples every 10 feet at 3,260' to TD
GOVT:	As per regulations
Detection:	Gas detection/ PASON Mud Log as per Geologist's request
Cores:	No coring
DST:	No DST's

## LOGGING PROGRAM - DISCUSS SCALES REQUIRED WITH VP OF GEOSCIENCES

	# of copies
DIL-GR-SP T.D. to surface casing	4
CNL-LDT-GR-CAL T.D. to 3,260'	4

Run a multi-arm caliper log to ensure correct calculation for cement volumes on casing or plugs.

Received: December 04, 2012

T14S, R8E, S.L.B.&M.

THUNDERBIRD ENERGY

Well location, NW 32-14-8, located as shown in the NW 1/4 NW 1/4 of Section 32, T14S, R8E, S.L.B.&M., Carbon County, Utah.

BASIS OF ELEVATION

SPOT ELEVATION LOCATED AT THE NORTHWEST CORNER OF SECTION 34, T13S, R8E, S.L.B.&M., TAKEN FROM THE JUMP CREEK, QUADRANGLE, UTAH, CARBON COUNTY, 7.5 MINUTE QUAD. (TOPOGRAPHIC MAP) PUBLISHED BY THE UNITED STATES DEPARTMENT OF THE INTERIOR, GEOLOGICAL SURVEY. SAID ELEVATION IS MARKED AS BEING 7236 FEET.

BASIS OF BEARINGS

BASIS OF BEARINGS IS A G.P.S. OBSERVATION.

G.L.O. Brass  
Cap, 1.6" High,  
Steel Post

Set Stone  
Of Stone

N89°48'37"W  
2602.94' (Meas.)

Set Marked  
Stone, Pile  
Of Stones

89°42'  
G.L.O.

767'  
Comp.

NW 32-14-8  
Elev. Ungraded Ground = 7672'

NORTH = 5183.64' (G.L.O.)

5200.80' (G.L.O.)

32

LOT 4

LOT 3

LOT 2

LOT 1

LOT 5

LOT 6

LOT 7

LOT 8

T14S  
T15S

WEST - 5346.00' (G.L.O.)

LEGEND:

- = 90° SYMBOL
- = PROPOSED WELL HEAD.
- ▲ = SECTION CORNERS LOCATED.

NAD 83 (SURFACE LOCATION)	
LATITUDE = 39°34'14.35"	(39.570653)
LONGITUDE = 111°03'30.18"	(111.058383)
NAD 27 (SURFACE LOCATION)	
LATITUDE = 39°34'14.48"	(39.570689)
LONGITUDE = 111°03'27.58"	(111.057661)



1000'  
500'  
0  
500'  
1000'

SCALE

CERTIFICATE

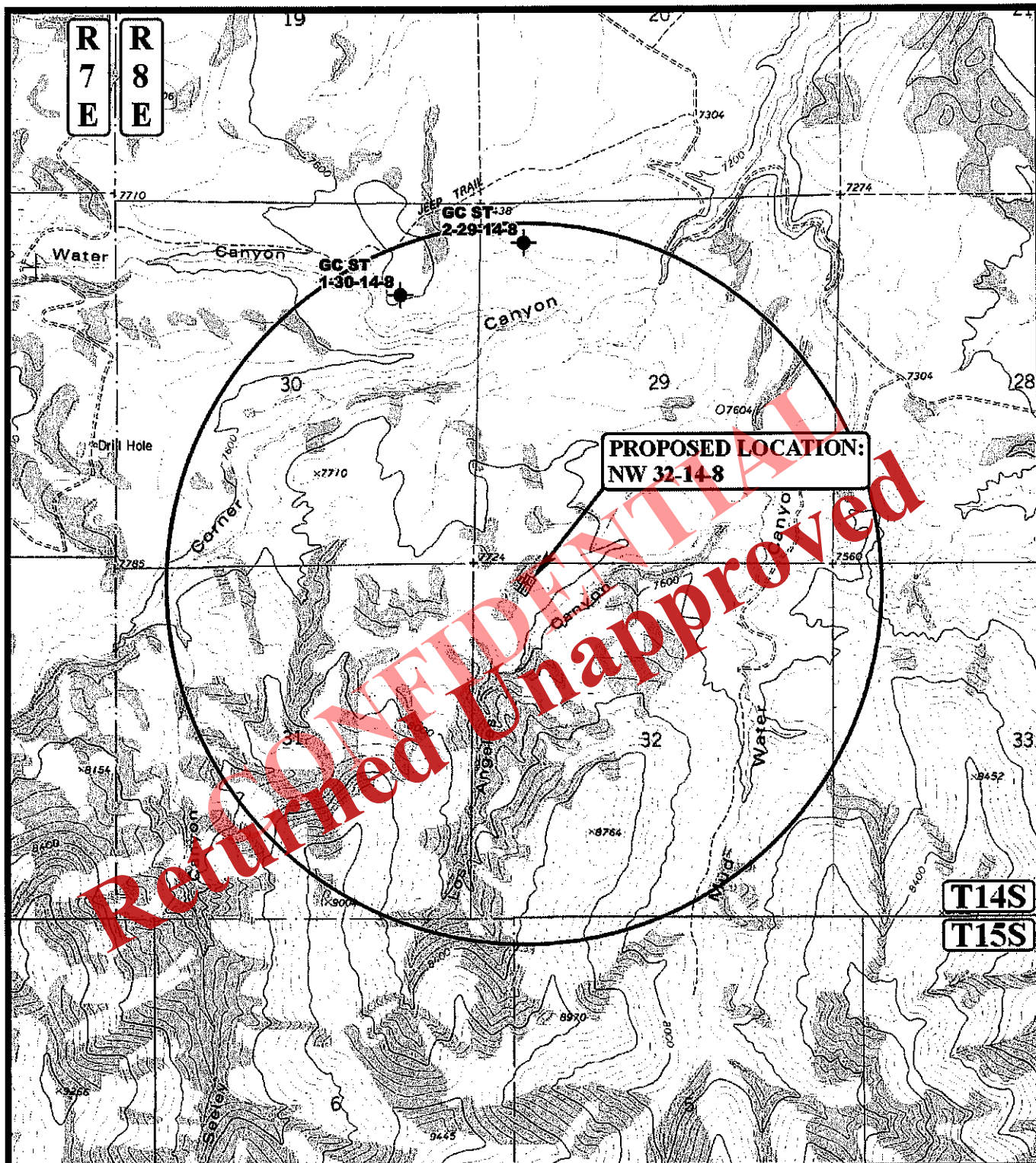
THIS IS TO CERTIFY THAT THE ABOVE SURVEY WAS PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

ROBERT L. KAY  
REGISTERED LAND SURVEYOR  
REGISTRATION NO. 161319  
STATE OF UTAH 08-0012

UTAH ENGINEERING & LAND SURVEYING  
85 SOUTH 200 EAST - VERNAL, UTAH 84078  
(435) 789-1017

SCALE 1" = 1000'	DATE SURVEYED: 07-19-12	DATE DRAWN: 08-03-12
PARTY G.O. S.R. B.L.B.	REFERENCES G.L.O. PLAT	
WEATHER HOT	FILE THUNDERBIRD ENERGY	





# **LEGEND:**

- Ø DISPOSAL WELLS
- PRODUCING WELLS
- SHUT IN WELLS
- ABANDONED WELLS
- TEMPORARILY ABANDONED



Uintah Engineering & Land Surveying  
 85 South 200 East Vernal, Utah 84078  
 (435) 789-1017 \* FAX (435) 789-1813



## **THUNDERBIRD ENERGY**

NW 32-14-8  
 SECTION 32, T14S, R8E, S.L.B.&M.  
 269' FNL 767' FWL

TOPOGRAPHIC  
 MAP

07 31 12  
 MONTH DAY YEAR

SCALE: 1" = 2000' DRAWN BY: C.I. REVISED: 00-00-00





November 27<sup>th</sup>, 2012

Utah Division of Oil, Gas and Mining  
1594 West North Temple, Suite 1210  
Box 145801  
Salt Lake City, Utah 84114-5801

To Whom It May Concern;

**Re: LOCATION EXEMPTION LETTER - GORDON CREEK STATE NW-32-14S-8E**

In reference to the State of Utah Oil & Gas Conservation Rule # R649-3-2, the proposed well GORDON CREEK STATE NW-32-14S-8E is an exception to the rule due to the topography of the 160 acre Section that the well is located in.

There are no additional lease owners within 460' of the proposed location.

If you have any further questions regarding this matter, please don't hesitate to contact me by telephone at (403) 453-1608 or via email at [bbrumwell@thunderbirdenergy.com](mailto:bbrumwell@thunderbirdenergy.com).

Respectfully;

Barry Brumwell, C.E.T.  
Vice President of Operations  
Thunderbird Energy  
Gordon Creek, LLC.

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#800, 555 - 4<sup>th</sup> Avenue S.W. Calgary, Alberta, Canada T2P 3E7

**Received:** December 04, 2012

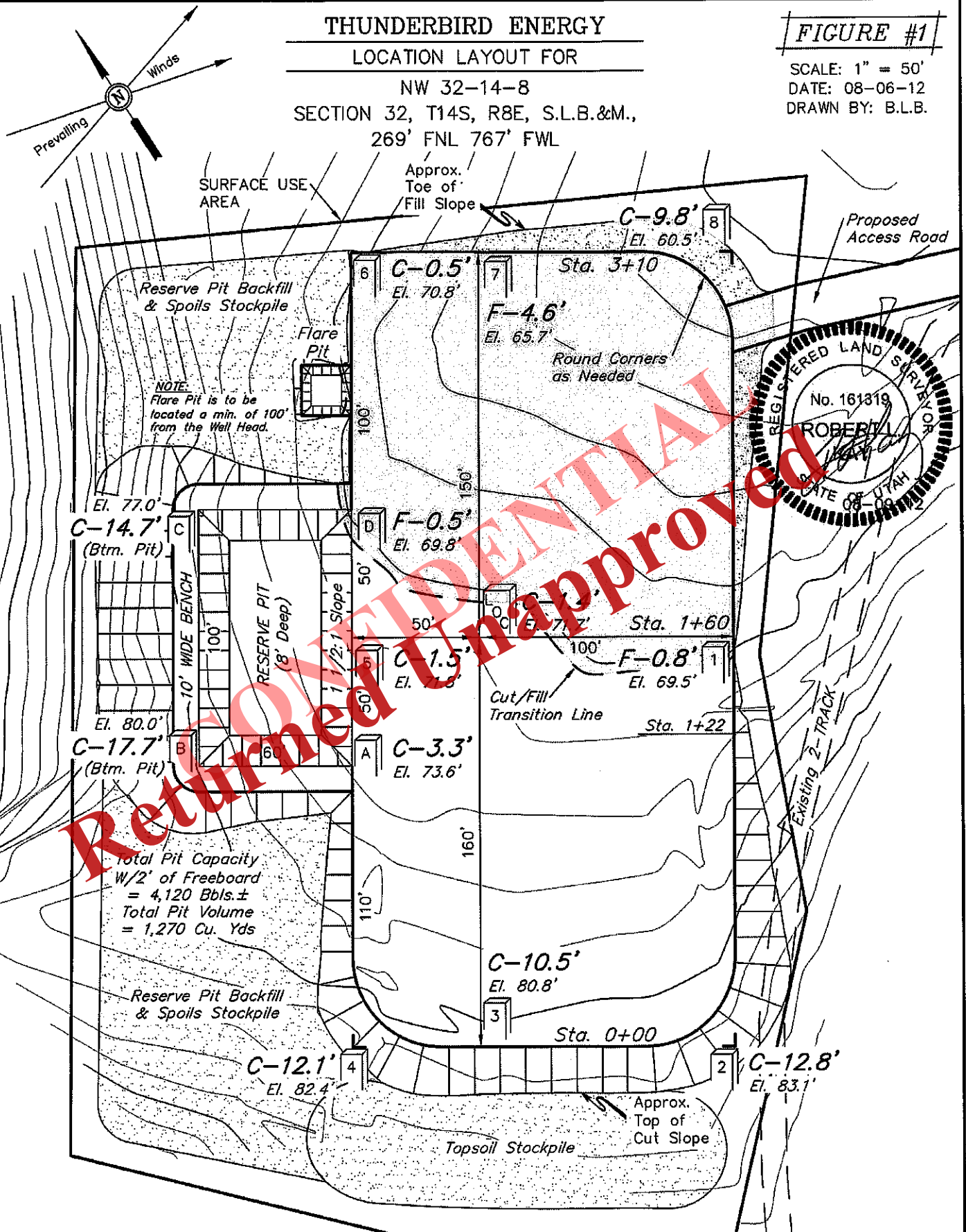
# THUNDERBIRD ENERGY

## LOCATION LAYOUT FOR

NW 32-14-8  
SECTION 32, T14S, R8E, S.L.B.&M.,  
269' FNL 767' FWL

FIGURE #1

SCALE: 1" = 50'  
DATE: 08-06-12  
DRAWN BY: B.L.B.



Elev. Ungraded Ground At Loc. Stake = 7671.7'  
FINISHED GRADE ELEV. AT LOC. STAKE = 7670.3'

UINTAH ENGINEERING & LAND SURVEYING  
85 So. 200 East \* Vernal, Utah 84078 \* (435) 789-1017

Received: December 04, 2012



# THUNDERBIRD ENERGY

## TYPICAL CROSS SECTIONS FOR

NW 32-14-8

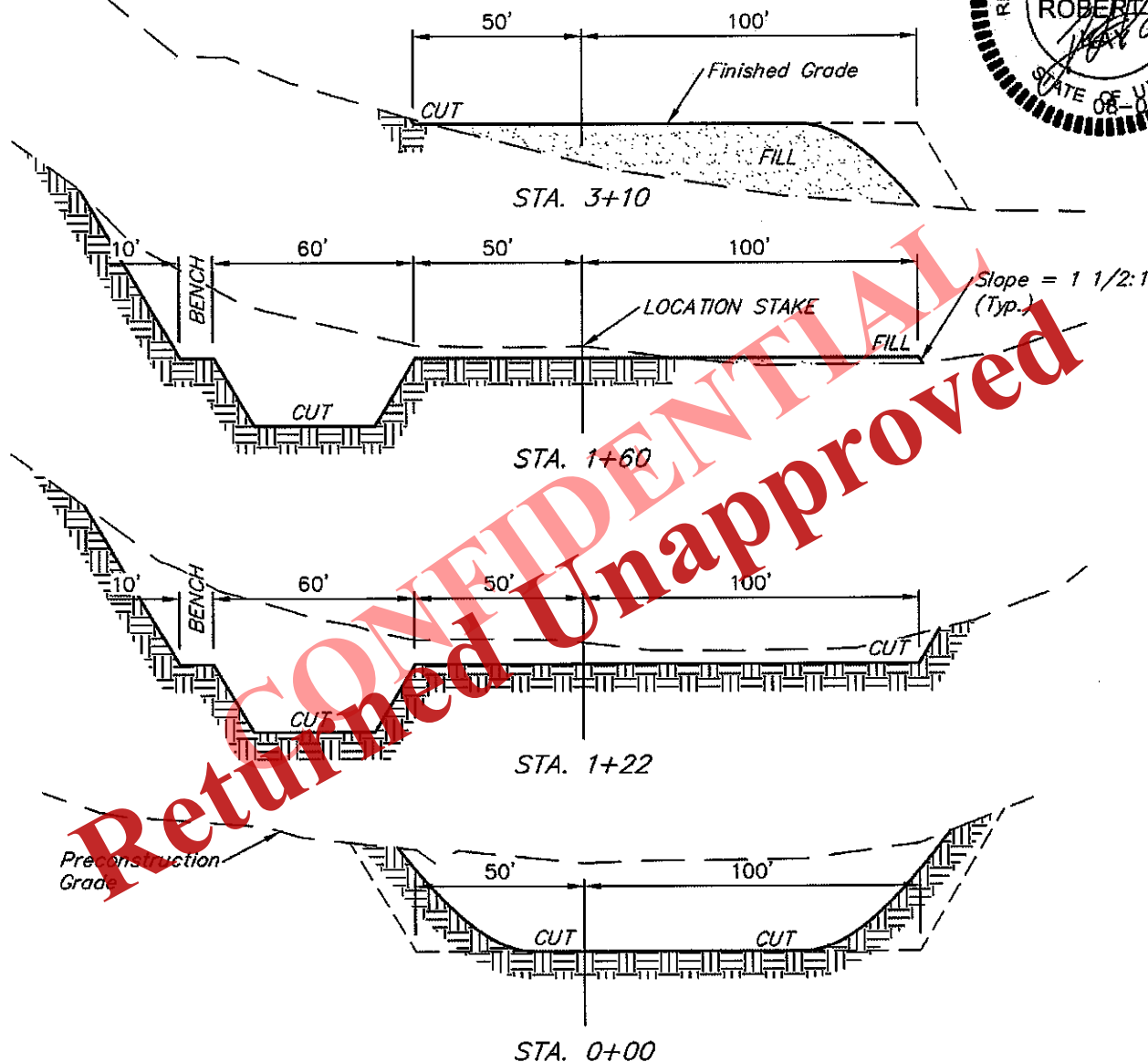
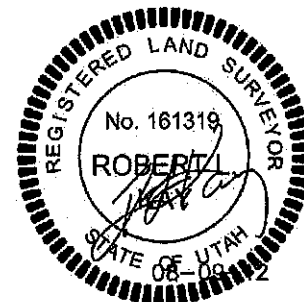
SECTION 32, T14S, R8E, S.L.B.&M.,

269' FNL 767' FWL

FIGURE #2

1" = 20'  
X-Section  
Scale  
1" = 50'

DATE: 08-06-12  
DRAWN BY: B.L.B.



### NOTE:

Topsoil should not be Stripped Below Finished Grade on Substructure Area.

### APPROXIMATE ACREAGES

WELL SITE DISTURBANCE = ± 2.492 ACRES  
ACCESS ROAD &  
PIPELINE DISTURBANCE = ± 0.101 ACRES  
TOTAL = ± 2.593 ACRES

\* NOTE:  
FILL QUANTITY INCLUDES  
5% FOR COMPACTION

### APPROXIMATE YARDAGES

(6") Topsoil Stripping = 1,280 Cu. Yds.  
Remaining Location = 8,460 Cu. Yds.  
TOTAL CUT = 9,740 CU.YDS.  
FILL = 3,870 CU.YDS.

EXCESS MATERIAL = 5,870 Cu. Yds.  
Topsoil & Pit Backfill = 1,920 Cu. Yds.  
(1/2 Pit Vol.)  
EXCESS UNBALANCE = 3,950 Cu. Yds.  
(After Interim Rehabilitation)

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# THUNDERBIRD ENERGY

## TYPICAL RIG LAYOUT FOR

NW 32-14-8

SECTION 32, T14S, R8E, S.L.B.&M.,

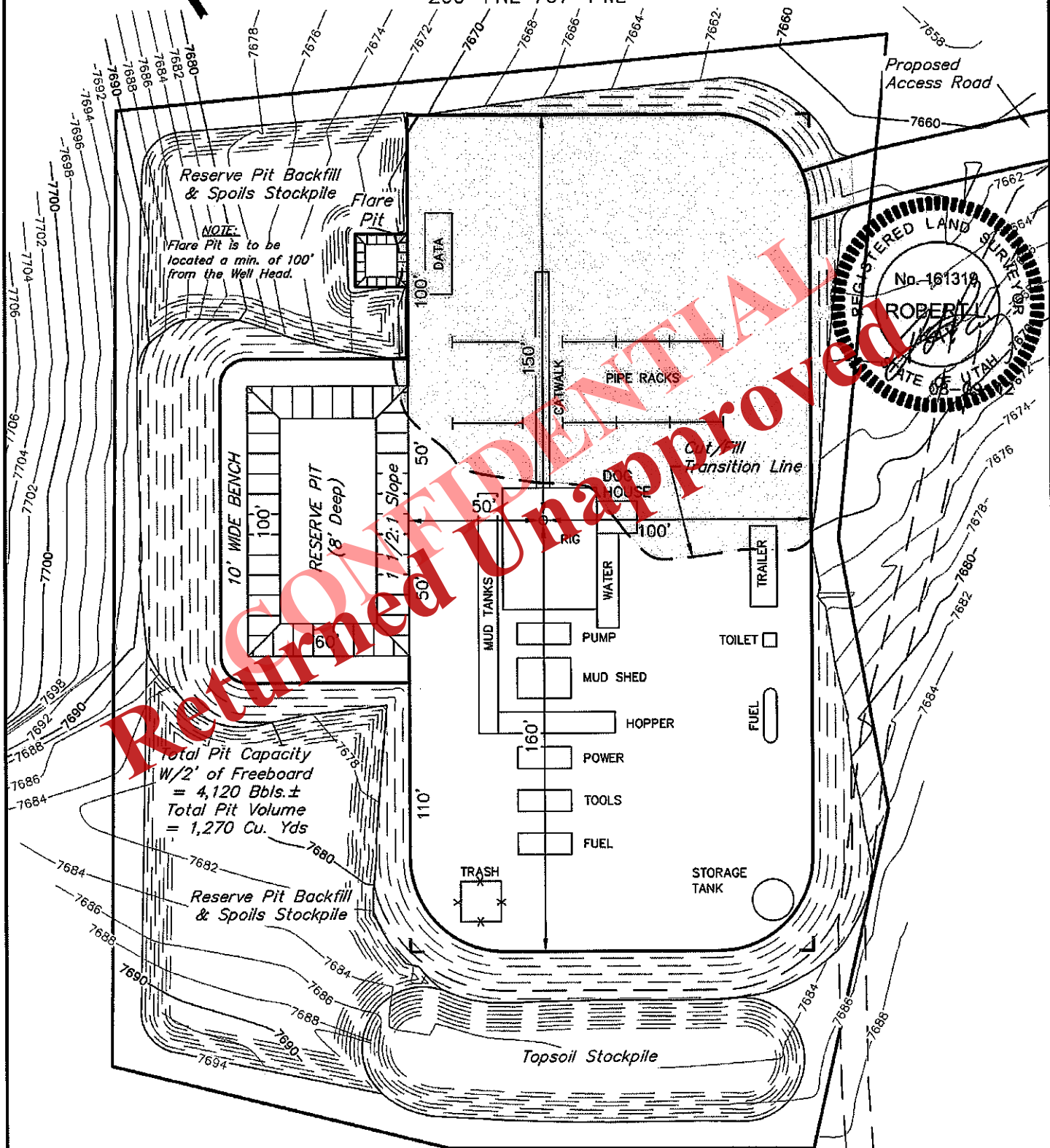
269' FNL 767' FWL

FIGURE #3

SCALE: 1" = 50'

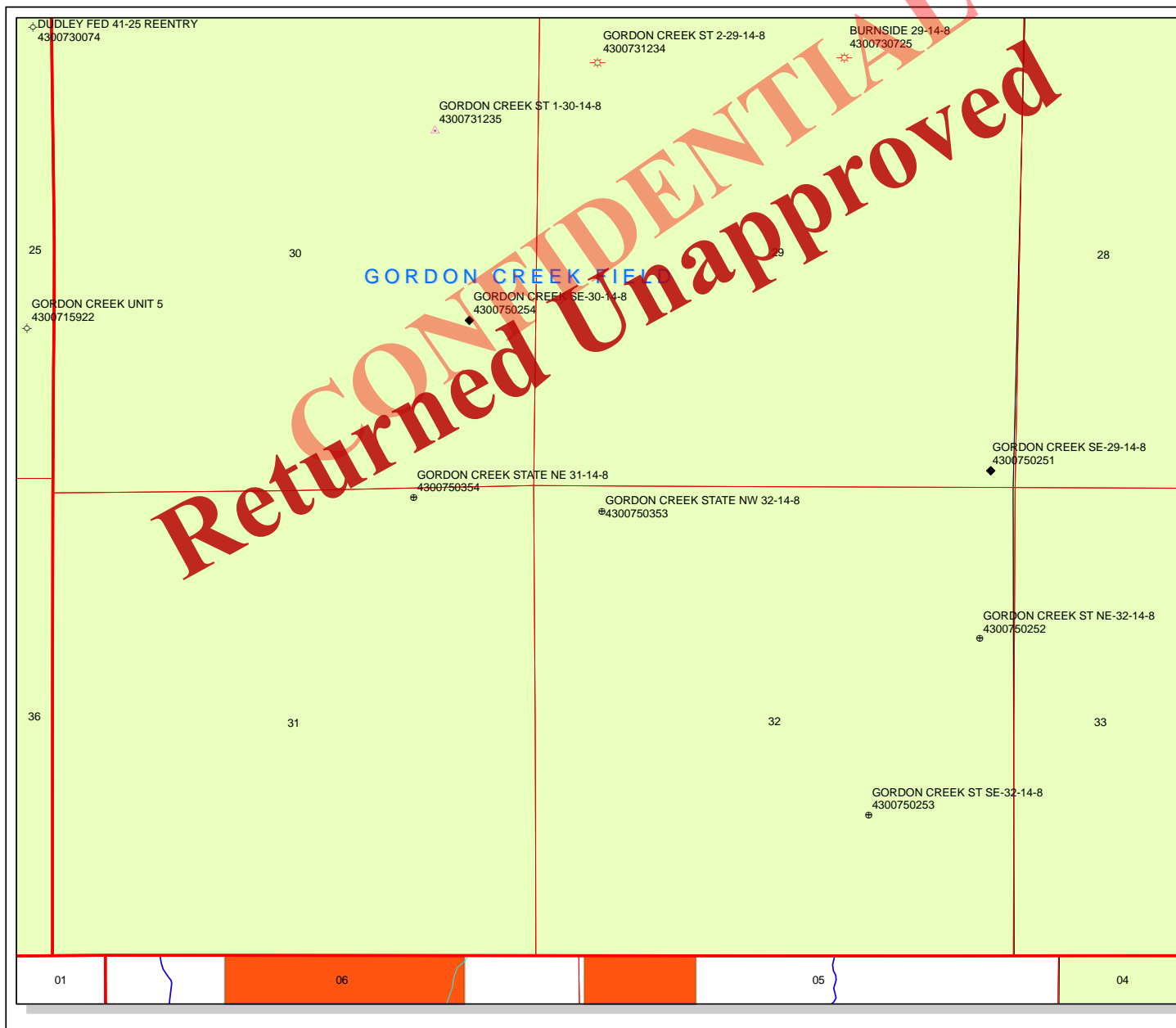
DATE: 08-06-12

DRAWN BY: B.L.B.



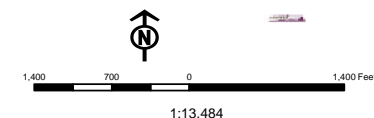
UINTAH ENGINEERING & LAND SURVEYING  
85 So. 200 East \* Vernal, Utah 84078 \* (435) 789-1017

Received: December 04, 2012



**API Number: 4300750353**  
**Well Name: GORDON CREEK STATE NW 32-14-8**  
**Township T14.0S Range R08.0E Section 32**  
**Meridian: SLBM**  
**Operator: GORDON CREEK, LLC**  
 Map Prepared:  
 Map Produced by Diana Mason

Units	Wells Query
<b>STATUS</b>	<b>Status</b>
ACTIVE	APD - Approved Permit
EXPLORATORY	DRL - Spudded (Drilling Commenced)
GAS STORAGE	GIW - Gas Injection
NF PP OIL	GS - Gas Storage
NF SECONDARY	LOC - New Location
PI OIL	OPS - Operation Suspended
PP GAS	PA - Plugged Abandoned
PP GEOTHERM	PGW - Producing Gas Well
PP OIL	POW - Producing Oil Well
SECONDARY	SGW - Shut-in Gas Well
TERMINATED	SOW - Shut-in Oil Well
<b>Fields</b>	TA - Temp. Abandoned
Unknown	TW - Test Well
ABANDONED	WDW - Water Disposal
ACTIVE	WW - Water Injection Well
COMBINED	WSW - Water Supply Well
INACTIVE	Bottom Hole Location - Oil/Gas/Dib
STORAGE	
TERMINATED	



Well Name	GORDON CREEK, LLC GORDON CREEK STATE NW 32-14-8 43007503			
String	Surf	Prod		
Casing Size(in)	8.625	5.500		
Setting Depth (TVD)	2065	4437		
Previous Shoe Setting Depth (TVD)	0	2065		
Max Mud Weight (ppg)	8.7	8.7		
BOPE Proposed (psi)	2000	3000		
Casing Internal Yield (psi)	2950	7740		
Operators Max Anticipated Pressure (psi)	800	3.5		

Calculations	Surf String	8.625	"
Max BHP (psi)	.052*Setting Depth*MW=	934	
			BOPE Adequate For Drilling And Setting Casing at Depth?
MASP (Gas) (psi)	Max BHP-(0.12*Setting Depth)=	686	YES <input type="checkbox"/> 2M Rotating Head for air drill
MASP (Gas/Mud) (psi)	Max BHP-(0.22*Setting Depth)=	480	YES <input type="checkbox"/> OK
			*Can Full Expected Pressure Be Held At Previous Shoe?
Pressure At Previous Shoe	Max BHP-.22*(Setting Depth - Previous Shoe Depth)=	480	NO <input type="checkbox"/> OK <input type="checkbox"/>
Required Casing/BOPE Test Pressure=		2065	psi
*Max Pressure Allowed @ Previous Casing Shoe=		0	psi *Assumes 1psi/ft frac gradient

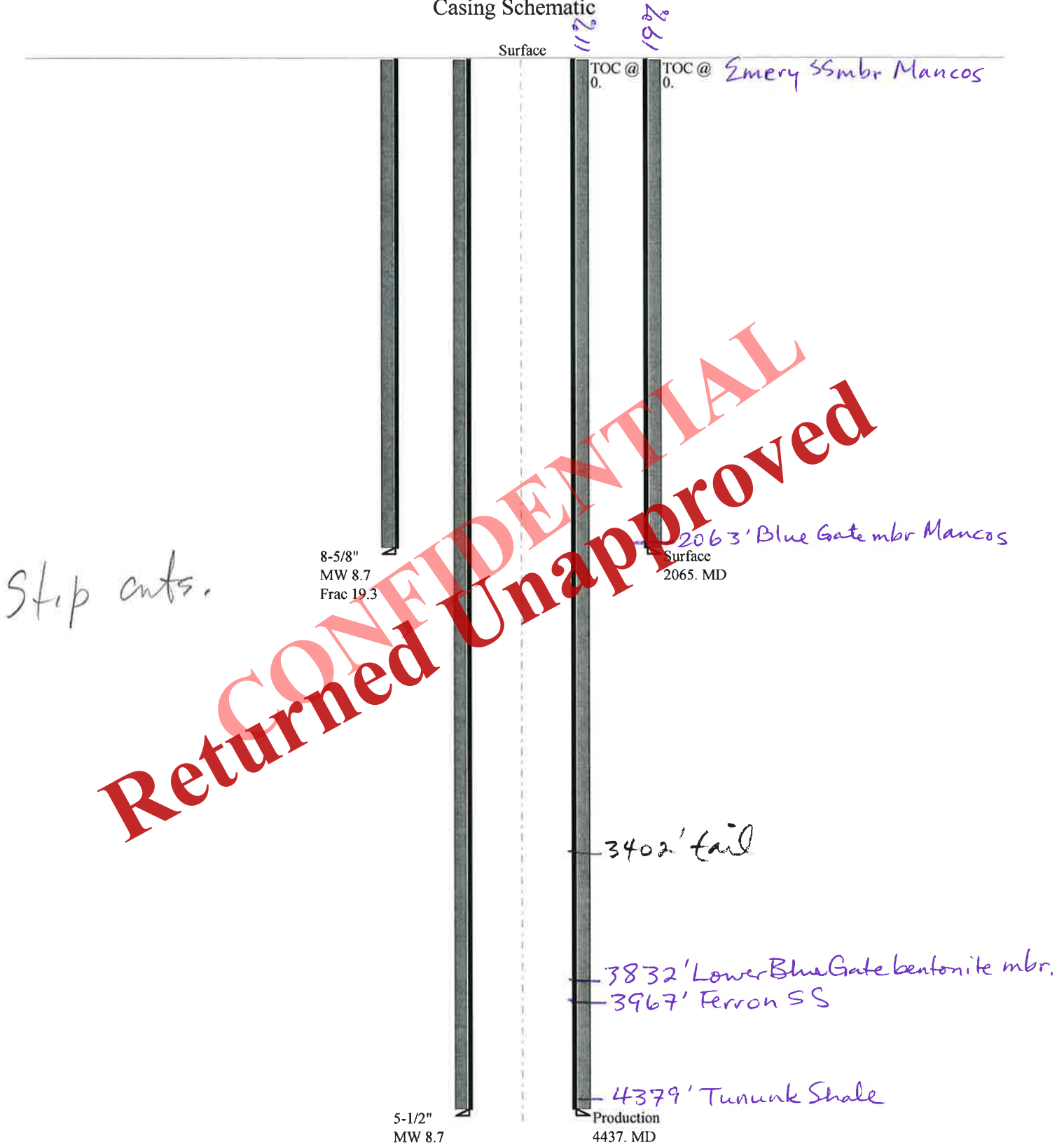
Calculations	Prod String	5.500	"
Max BHP (psi)	.052*Setting Depth*MW=	2007	
			BOPE Adequate For Drilling And Setting Casing at Depth?
MASP (Gas) (psi)	Max BHP-(0.12*Setting Depth)=	1479	YES <input type="checkbox"/> 3M BOPE double gate with 2M rotate head
MASP (Gas/Mud) (psi)	Max BHP-(0.22*Setting Depth)=	931	YES <input type="checkbox"/> OK
			*Can Full Expected Pressure Be Held At Previous Shoe?
Pressure At Previous Shoe	Max BHP-.22*(Setting Depth - Previous Shoe Depth)=	1485	YES <input type="checkbox"/> OK <input type="checkbox"/>
Required Casing/BOPE Test Pressure=		3000	psi
*Max Pressure Allowed @ Previous Casing Shoe=		2065	psi *Assumes 1psi/ft frac gradient

Calculations	String		"
Max BHP (psi)	.052*Setting Depth*MW=		
			BOPE Adequate For Drilling And Setting Casing at Depth?
MASP (Gas) (psi)	Max BHP-(0.12*Setting Depth)=		NO <input type="checkbox"/>
MASP (Gas/Mud) (psi)	Max BHP-(0.22*Setting Depth)=		NO <input type="checkbox"/>
			*Can Full Expected Pressure Be Held At Previous Shoe?
Pressure At Previous Shoe	Max BHP-.22*(Setting Depth - Previous Shoe Depth)=		NO <input type="checkbox"/>
Required Casing/BOPE Test Pressure=			psi
*Max Pressure Allowed @ Previous Casing Shoe=			psi *Assumes 1psi/ft frac gradient

Calculations	String		"
Max BHP (psi)	.052*Setting Depth*MW=		
			BOPE Adequate For Drilling And Setting Casing at Depth?
MASP (Gas) (psi)	Max BHP-(0.12*Setting Depth)=		NO <input type="checkbox"/>
MASP (Gas/Mud) (psi)	Max BHP-(0.22*Setting Depth)=		NO <input type="checkbox"/>
			*Can Full Expected Pressure Be Held At Previous Shoe?
Pressure At Previous Shoe	Max BHP-.22*(Setting Depth - Previous Shoe Depth)=		NO <input type="checkbox"/>
Required Casing/BOPE Test Pressure=			psi
*Max Pressure Allowed @ Previous Casing Shoe=			psi *Assumes 1psi/ft frac gradient

43007503530000 Gordon Creek State NW 32-14-8

Casing Schematic



Received: June 05, 2013

Well name: **43007503530000 Gordon Creek State NW 32-14-8**  
 Operator: **CORDON CREEK, LLC**  
 String type: **Surface**  
 Location: **CARBON COUNTY**  
 Project ID: **43-007-50353**

**Design parameters:**

**Collapse**

Mud weight: 8.700 ppg  
 Design is based on evacuated pipe.

**Minimum design factors:**

**Collapse:**

Design factor 1.125

**Burst:**

Design factor 1.00

**Environment:**

H2S considered? No  
 Surface temperature: 74 °F  
 Bottom hole temperature: 103 °F  
 Temperature gradient: 1.40 °F/100ft  
 Minimum section length: 100 ft

Cement top: Surface

**Burst**

Max anticipated surface pressure: 1,473 psi  
 Internal gradient: 0.120 psi/ft  
 Calculated BHP 1,721 psi

No backup mud specified.

**Tension:**

8 Round STC: 1.80 (J)  
 8 Round LTC: 1.70 (J)  
 Buttress: 1.60 (J)  
 Premium: 1.50 (J)  
 Body yield: 1.50 (B)

Tension is based on air weight.  
 Neutral point: 1,795 ft

**Non-directional string.**

**Re subsequent strings:**

Next setting depth: 4,437 ft  
 Next mud weight: 8.700 ppg  
 Next setting BHP: 2,005 psi  
 Fracture mud wt: 19.250 ppg  
 Fracture depth: 2,065 ft  
 Injection pressure: 2,065 psi

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Est. Cost (\$)
1	2065	8.625	24.00	J-55	ST&C	2065	2065	7.972	10631
Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (kips)	Tension Strength (kips)	Tension Design Factor
1	933	1370	1.468	1721	2950	1.71	49.6	244	4.92 J

Prepared by: Helen Sadik-Macdonald  
 Div of Oil, Gas & Mining

Phone: 801 538-5357  
 FAX: 801-359-3940

Date: May 30, 2013  
 Salt Lake City, Utah

**Remarks:**

Collapse is based on a vertical depth of 2065 ft, a mud weight of 8.7 ppg. The casing is considered to be evacuated for collapse purposes. Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension.

Burst strength is not adjusted for tension.

Engineering responsibility for use of this design will be that of the purchaser.

**Received: June 05, 2013**

Well name: **43007503530000 Gordon Creek State NW 32-14-8**  
 Operator: **CORDON CREEK, LLC**  
 String type: **Production**  
 Location: **CARBON COUNTY**  
 Project ID: **43-007-50353**

**Design parameters:**

**Collapse**

Mud weight: 8.700 ppg  
 Design is based on evacuated pipe.

**Minimum design factors:**

**Collapse:**

Design factor 1.125

**Burst:**

Design factor 1.00

**Environment:**

H2S considered? No  
 Surface temperature: 74 °F  
 Bottom hole temperature: 136 °F  
 Temperature gradient: 1.40 °F/100ft  
 Minimum section length: 100 ft

Cement top: Surface

**Burst**

Max anticipated surface pressure: 1,029 psi  
 Internal gradient: 0.220 psi/ft  
 Calculated BHP 2,005 psi

No backup mud specified.

**Tension:**

8 Round STC: 1.80 (J)  
 8 Round LTC: 1.80 (J)  
 Buttress: 1.60 (J)  
 Premium: 1.50 (J)  
 Body yield: 1.60 (B)

**Non-directional string.**

Tension is based on air weight.  
 Neutral point: 3,852 ft

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Est. Cost (\$)
1	4437	5.5	17.00	N-80	LT&C	4437	4437	4.767	25009
Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (kips)	Tension Strength (kips)	Tension Design Factor
1	2005	6290	3.137	2005	7740	3.86	75.4	348	4.61 J

Prepared by: Helen Sadik-Macdonald  
 Div of Oil, Gas & Mining

Phone: 801 538-5357  
 FAX: 801-359-3940

Date: May 30, 2013  
 Salt Lake City, Utah

**Remarks:**

Collapse is based on a vertical depth of 4437 ft, a mud weight of 8.7 ppg. The casing is considered to be evacuated for collapse purposes. Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension.

Burst strength is not adjusted for tension.

Engineering responsibility for use of this design will be that of the purchaser.

**Received: June 05, 2013**





GARY R. HERBERT  
*Governor*

SPENCER J. COX  
*Lieutenant Governor*

# State of Utah

## DEPARTMENT OF NATURAL RESOURCES

MICHAEL R. STYLER  
*Executive Director*

### Division of Oil, Gas and Mining

JOHN R. BAZA  
*Division Director*

December 03, 2014

GORDON CREEK, LLC  
1179 E Main #345  
Price, UT 84501

Re: Application for Permit to Drill - CARBON County, Utah

Ladies and Gentlemen:

The Application for Permit to Drill (APD) for the GORDON CREEK STATE NW 32-14-8 well, API 43007503530000 that was submitted December 04, 2012 is being returned unapproved. If you plan on drilling this well in the future, you must first submit a new application.

Should you have any questions regarding this matter, please call me at (801) 538-5312.

Sincerely,

Diana Mason  
Environmental Scientist

Enclosure

cc: Bureau of Land Management, Vernal, Utah





